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THE PRACTICAL TEACHER

A WEEKLY JOURNAL FOR MASTERS MISTRESSES AND STUDENTS

VOL. XI. No. 3. SATURDAY, JANUARY 31, 1891. PRICE 1D.

UNIVERSITY CORRESPONDENCE COLLEGE

IN 1890,

158

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☛ SEE ALSO PAGE 47.

New Inspection Questions.

[We shall always be glad to receive (in strict confidence) *bona fide* Inspection Questions and Drawing Examinations from our readers.—Ed. *P. T.*]

TEST CARDS FOR STANDARD III.—BOYS.

No. 1.

1. Add £694 18s. 5¼d., £87 13s. 11½d., £6245 17s. 6¼d., £28,496 13s. 8½d., £5748 18s. 10¼d., £96 16s. 6½d.

2. From £29,001 1s. 0¼d. take £86 13s. 7½d.

3. Divide 7,208,645 by 186.

4. A street contains 37 houses on each side. How many houses would there be in 86 such streets?

No. 2.

1. Add £29,876 17s. 4¼d., £8095 13s. 10½d., £37,441 16s. 5¾d., £638 18s. 8½d., £29 12s. 7¼d., £54,273 19s. 6¾d.

2. From £7008 13s. 5¼d. take £609 16s. 4¾d.

3. Divide 18,479,006 by 59.

4. What is left when six pounds five shillings and eight pence is taken from ninety-one pounds twelve shillings and six pence?

No. 3.

1. Find the sum of £38,749 17s. 8½d., £90,876 12s. 6¼d., £3004 13s. 7¼d., £78 19s. 9½d., £9 10s. 10¾d., £40 18s. 11½d.

2. Take £3009 15s. 8½d. from £48,179 13s. 4¼d.

3. Divide 19,192,938 by 327.

4. What number multiplied by 654 will give 19,192,938?

No. 4.

1. Add £9467 18s. 9½d., £983 17s. 11¾d., £85,697 14s. 6½d., £8946 15s. 10¾d., £948 17s. 8½d., £95,637 14s. 7½d.

2. Take £99 19s. 11½d. from £10,010 10s. 10¼d.

3. Divide 643,259 by 86.

4. A book contains 96 pages, and on each page are 4076 letters. How many letters would there be in two such books?

No. 5.

1. Add £849 19s. 6¼d., £46 18s. 7½d., £327 15s. 4¼d., £7609 17s. 11½d., £43,795 13s. 8¾d., £8249 18s. 6d.

2. Take £909 9s. 9½d. from £40,001 1s. 1¾d.

3. Divide 465,738 by 98.

4. A book contains 463,710 letters on 87 pages. How many letters is that on one page?

No. 6.

1. Add £8327 19s. 4¾d., £96 18s. 8½d., £5948 13s. 11¾d., £895 15s. 7½d., £63,210 13s. 10d., £8094 18s. 5¾d.

2. Take £199 18s. 7¾d. from £61,016 16s. 6½d.

3. Divide 6,201,394 by 86.

4. A baker makes 475 loaves daily; how many loaves would he make in two years of 365 days each?

No. 7.

1. Add £38,749 17s. 8½d., £90,876 12s. 6¼d., £3004 13s. 7¼d., £78 19s. 9½d., £9 10s. 10¾d., £40 18s. 11½d.

2. From £48,179 13s. 4¼d. take £3009 15s. 8½d.

3. Divide 192,938 by 327.

4. A book contains 406 pages; each page contains 53 lines, and every line contains 72 letters. How many letters are there in the book?

No. 8.

1. Find the sum of £9374 18s. 6½d., £789 19s. 4¾d., £86,396 16s. 7½d., £437 15s. 8¼d., £96 19s. 9½d., £8 18s. 11¾d.

2. From £29,013 13s. 0½d. take £19,064 17s. 11¾d.

3. Divide 896,432 by 146.

4. A miller sells 256 sacks of flour in a month. How many would he sell in twenty-four months?

No. 9.

1. Add £8695 14s. 7¼d., £863 19s. 11½d., £68 14s. 7¾d., £8629 15s. 7½d., £949 13s. 6¼d., £8 11s. 11¾d.

2. From £21,010 10s. 0¼d. take £6049 18s. 11½d.

3. Divide 253,695 by 146.

4. If there are 60 minutes in one hour and 24 hours in one day, how many minutes are there in 21 days?

No. 10.

1. Add £64,397 18s. 4¼d., £468 15s. 7½d., £96 18s. 11¾d., £6734 17s. 5½d., £53,847 13s. 6¼d., £4639 18s. 5¼d.

2. From £41,015 13s. 1¼d. take £967 18s. 11½d.

3. Divide 639,456 by 87.

4. A book contains 96 pages, on each page are 785 letters. How many letters would there be in three such books?

No. 11.

1. Add £84,693 18s. 11¾d., £9856 19s. 10½d., £479 13s. 6¼d., £73,828 18s. 3½d., £9046 13s. 7¼d., £694 18s. 6½d.

2. Take £99 17s. 11¾d. from £21,010 13s. 1½d.

3. Divide 963,845 by 176.

4. What number multiplied by 5476 will give 963,776?

No. 12.

1. Add £8694 18s. 7¼d., £85 16s. 11½d., £746 19s. 10d., £9321 17s. 8¾d., £64,248 13s. 7½d., £73,496 15s. 4¾d.

2. From £23,601 13s. 3½d. take £899 18s. 4¾d.

3. Divide 6,040,296 by 87.

4. A man walks 15 miles in one day. How many miles would he walk in 5 weeks of 6 days each?

No. 13.

1. Add £8694 18s. 7¼d., £85 16s. 11½d., £746 19s. 10d., £9321 17s. 8¾d., £64,248 13s. 7½d., £85,927 13s. 8½d.

2. Take £768 15s. 7¾d. from £23,601 13s. 3½d.

3. Divide 6,040,296 by 95.

4. A coal train consists of forty trucks, each truck contains 200 cwts. of coal. How many hundred weights would there be in 15 such trains?

Teachers' Notes of Drawing Lessons for Standard I.*

By an Art Teacher under the London School Board.

VII.

(Without rulers.)—Begin to use the words horizontal and perpendicular.

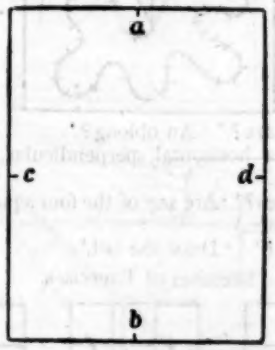
Marking the Middle:

Place a chalk-mark somewhere near the middle of the top edge of the board, and exercise the class in telling when the two parts of the top are equal—when not—which is the bigger—which way must the mark be moved, etc.

Let them mark their slates in the same way; then look round, making each one correct his marking if wrong. Children who seem quite unable to point to the middle can readily tell, after a mark is made, which side is bigger than the other.

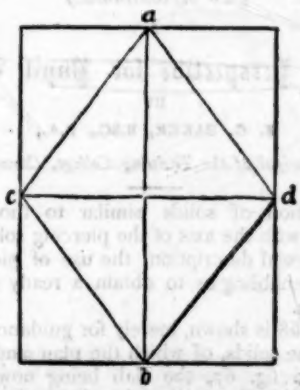
Mark the middle of the bottom edge, and examine slates again.

Mark the two sides, and look round for the third time. Get all four marks in the right place. Too much importance cannot be attached to this.



Draw upright line from *a* to *b* and *call* it (don't write it) 'perpendicular.' Show a plumb-line.

Draw level line from *c* to *d*, 'horizontal.' Show a spirit-level.



* The Teaching of Drawing becomes compulsory on September 1st, 1891. These articles will be specially helpful to teachers who know but little of the subject. They will teach them how to teach it successfully.

Let the class repeat the words until they know the *sound* of them.

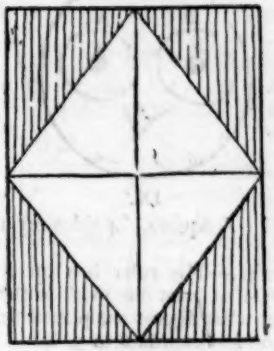
Draw slanting lines *ac*, *ad*, *cb*, *db*. (See Lesson II.)

Which lines are horizontal?

" " perpendicular?

" " slanting?

Perpendicular *to* the floor.



VIII.

The preceding lessons have been worked up to the edges of the slate without boundary lines.

A square:

Draw a *horizontal* line across near the top and rub out a bit at each end, leaving *ab*.

Draw a *perpendicular* line from *a* to the bottom. (Refer to Lesson VI.)

'Which line is longer than the other?'

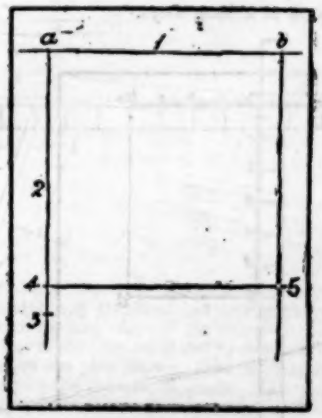
To make the two lines equal a piece at the bottom must be rubbed out. 'How much?'

'Will up to the mark (3) do?' Move the mark until the children think it is in the right place. Then, 'to make sure,' turn the blackboard sideways and see if it still looks right. After altering, if necessary, replace the board and let the class copy it, looking after slanting perpendiculars and unequal marking.

Draw down from *b*.

Place a mark on the right hand line 'just as low down' as that on the left (4), (5). Draw a level line across from (4) to (5). Let the class watch while the lines are cleared and improved, corners finished off neatly, &c., leaving an enclosed figure.

'What is it?' 'What is it made of?' 'How many lines?' 'How many corners?' Square corners like new books, slates, &c. Corners are *Angles*.



A rather dry lesson, so:—

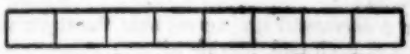
Draw this (1), this (2), (3), (4), (5), (6). 'What is it?' 'How many angles has it got?' 'What does it do with its angle?' 'Does the square ever open one of its angles and gobble a mouse?' &c.

IX.

Last lesson? A square. 4 sides equal—4 square angles.

Rulers—Inches.—The ruler has on it marks and figures. Show that from one mark to the next is one inch, no matter what figures are placed there—from 2 to 3, 3 to 4, and backwards 6 to 5, &c.

Use a large ruler on which the children cannot see figures, and mark inches with chalk on an enlarged scale, say 3 inches representing one inch, or sketch such a scale on blackboard.



Then practice for some time in telling distances by *counting spaces*, not counting marks nor looking at figures. Rulers for Standard I. would be as well without figures.

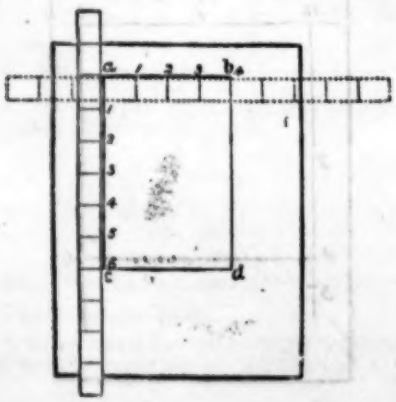
Draw a horizontal line 4 inches long.

1. Lay the ruler straight with a mark coming where you want the line to begin, and draw the chalk along—the children counting 1, 2, 3, 4 spaces. (*a* to *b*.) Then on slates. Do not allow the *end* of the ruler to be used.

2. Place the ruler *upright* with a mark at *a*, and draw a line downwards, counting through 6 spaces to *c*. Then 6 from *b* to *d*, and rule a line across from *c* to *d*. 'How long is the bottom line?'

In the last lesson the figure had to be cleaned up. This should need no cleaning up.

'Is it a square?' Oblong. 'What is the difference?' 'Lines?' Angles?' 'Which lines are parallel, horizontal, perpendicular?' 'Walk round it—how far?' 'How far from *a* to *b* and then to *d*?' 'How far nearest way from *c* to *a*?' 'How far the longest way?' Look at it long ways.



X.

'Show me an inch of finger?' (No rulers.) 'Two inches?' 'Four?' 'Six?'

Begin near the top and draw an upright line down the middle about six inches long. 'As long as the ——?' 'last lesson?'

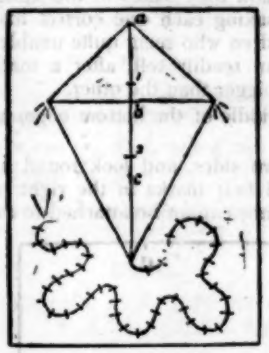
'If three boys are to eat a sugar stick as long as that line what must first be done?'

If it is cut into three pieces like this (1), (2), which is the biggest bit?' (Very few boys don't know the biggest bit when they see it.)

Alter marks till parts are fairly equal, and see it done on the slates.

Through the top mark draw a level line so that each side-piece is as long as the top part (*a* to *b*.)

Draw two slanting lines at the top, then two at the bottom.



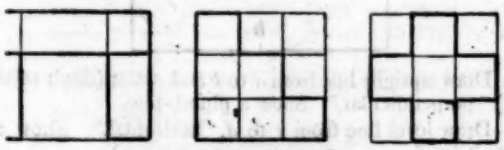
'Is it a square?' 'An oblong?'

'What lines horizontal, perpendicular, slanting?' *Inclined.*

'What angles?' 'Are any of the four square angles?' (The top corner.)

'What is it?' 'Draw the tail.'

Sketches of Exercises.



(To be continued.)

Practical Perspective for Pupil Teachers.

BY

E. C. BAKER, B.SC., B.A.,

Vice-Principal of the Training College, Carmarthen.

THE projection of solids similar to those already treated, but with the axis of the piercing solid vertical, needs no special description, the use of picture lines in this case enabling us to obtain a ready solution of any problem.

In figure 68 is shown, merely for guidance, the projection of the solids, of which the plan and elevation are given in fig. 67, the slab being now supposed horizontal, with the corner A 2 ft. to the right and touching the picture plane, the lower half of the fig. 67 being therefore now to be regarded as an elevation, and the upper half as the plan.

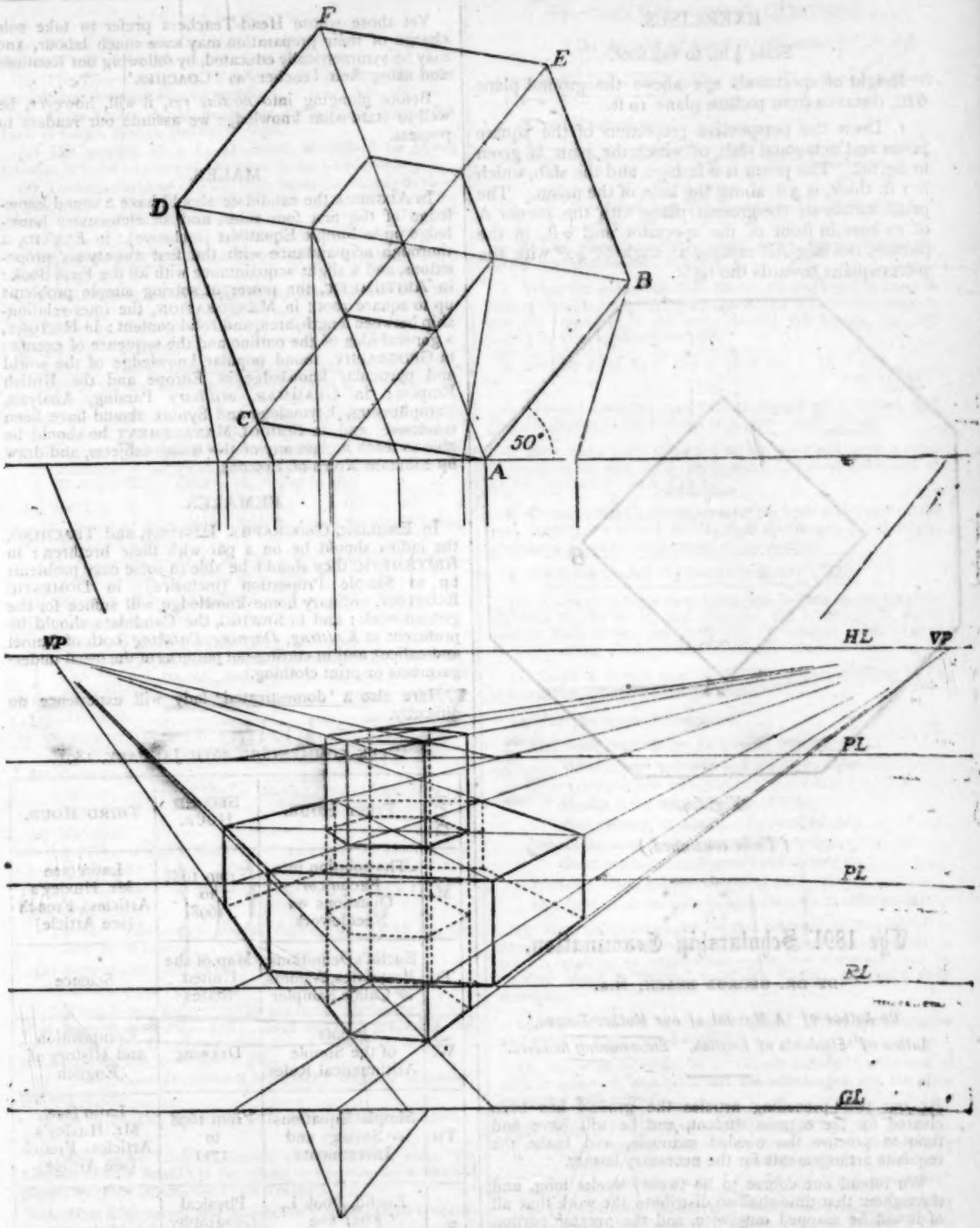


Fig. 68.

NOTE.—Special attention should be paid to the method of solution employed in fig. 68. The vanishing points employed are those for the lines AB and CD, and lines parallel to them. First AB and CD are projected independently, and AC then falls into place. Then the fact that CE is parallel to AB, and also BE parallel to CD, enables us to obtain the projection of BE. Similar reasoning applies to DF; and the projection of EF, as in the case of AC, is then determined by what has already been done. By these means we obtain the horizontal faces of the slab and the base and top of the prism. The points at which the long edges of the prism enter and leave the hexagonal faces of the slab are found by means of the diagonals of those faces as the plan shows. The work is shown only for the upper face for the sake of clearness. The vanishing points may then be used to test the accuracy of the work in the case of the small hexagons obtained by the means indicated.

EXERCISES.

Scale ½ in. to the foot.

Height of spectator's eye above the ground plane 6 ft., distance from picture plane 10 ft.

1. Draw the perspective projection of the square prism and octagonal slab, of which the plan is given in fig. 69. The prism is 8 ft. high, and the slab, which is 1 ft. thick, is 3 ft. above the base of the prism. The prism stands on the ground plane with the corner A of its base in front of the spectator and 2 ft. in the picture, the face AB making an angle of 40° with the picture plane towards the right.

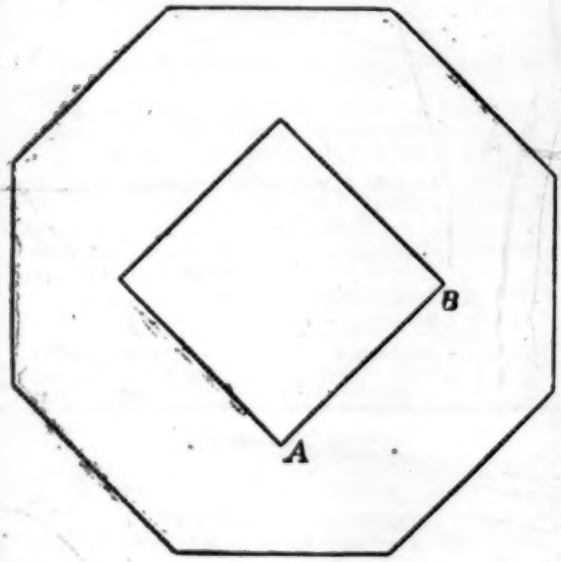


Fig. 69.

(To be continued.)

—o—

The 1891 Scholarship Examination.

BY DR. GEORGE BEACH, M.A.

Co-Author of 'A Manual of our Mother-Tongue,'

Author of 'Elements of English,' 'Entertaining Readers.'

By our two preceding articles the ground has been cleared for the earnest student, and he will have had time to procure the needed manuals, and make the requisite arrangements for the necessary leisure.

We intend our course to be twenty weeks long, and throughout that time shall so distribute the work that all of it will be mapped out twice, and the greater portion of it many times over.

But we must earnestly entreat our readers 'To trust us not at all, or all in all,' and faithfully to follow our guidance, except where perhaps they are thoroughly proficient.

Those who join our Training Classes will be especially catered for, and not only will they be led into systematic study but will be trained in the Art of Answering.

Yet those whose Head-Teachers prefer to take sole charge of their preparation may save much labour, and may be symmetrically educated, by following our Routines and using their Teachers as 'COACHES.'

Before plunging into *medias res*, it will, however, be well to state what knowledge we assume our readers to possess.

MALES.

In ALGEBRA the candidate should have a sound knowledge of the first four rules, and an elementary knowledge up to Simple Equations (inclusive): in EUCLID, a thorough acquaintance with the first twenty-six propositions, and a slight acquaintance with all the First Book: in ARITHMETIC, the power of solving simple problems up to square root: in MENSURATION, the inter-relationship between length, area, and solid content: in HISTORY, a general idea of the outline and the sequence of events: in GEOGRAPHY, sound popular knowledge of the world and particular knowledge of Europe and the British Empire: in GRAMMAR, *ordinary* Parsing, Analysis, Paraphrasing, Etymology and Syntax should have been mastered: and in SCHOOL-MANAGEMENT he should be able to teach a class any of the usual subjects, and draw up common Notes of Lessons.

FEMALES.

In ENGLISH, GEOGRAPHY, HISTORY, and TEACHING, the ladies should be on a par with their brethren; in ARITHMETIC they should be able to solve easy problems up to Simple Proportion (inclusive); in DOMESTIC ECONOMY, ordinary home knowledge will suffice for the ground-work; and in SEWING, the Candidate should be proficient in *Knitting*, *Darning*, *Patching* (both of flannel and calico), and in cutting-out patterns of the usual under-garments or print clothing.

Here also a 'domesticated' lady will experience no difficulty.

WEEK COMMENCING 26TH JANUARY, 1891

DAYS.	FIRST HOUR.	SECOND HOUR.	THIRD HOUR.
M.	The solution into Factors *or* Questions on Needlework	From 1688 to 1698	Latin (see Mr. Huxley's Articles), French (see Article)
TU.	Euclid's Definitions, Postulates, Axioms, *or* Calico Sampler	Map of the United States	Science
W.	Proofs of the Simple Arithmetical Rules	Drawing	Composition and History of English
TH.	Simple Equations *or* Savings and Investments	From 1698 to 1711	Latin (see Mr. Huxley's Articles), French (see Article)
F.	Euclid, Book I., First five Propositions *or* Calico Sampler	Physical Geography of United States	Science
S.	Mensuration of Rectangles — Fractions	Repetition and Macaulay's Essay on Walpole	Punishments, Rewards / Paraphrasing and Table of English Literature

Remarks on Routine.

(*a*) Where the work for Males and Females is different, the lower half of the column prescribes the latter.

(*b*) The Literature given for Saturday is also intended to be read during the week as a recreation.

(*c*) Three copies should be written during each week, one each of Large, Round, and Small-hand.

(*d*) The services of a friend should be utilised for fifteen minutes in order to give out Dictation to the Candidate.

(*e*) Towards the close of May, three hours (previously devoted to Science and Drawing) will be at liberty to be utilised for Music, Geography and English, etc.

(*f*) Factors (Algebra).

Hamblin Smith, Examples XVII. to XXVII., sums 6 and 11 in all; *or*

Charles Smith, Examples XXII. to XXVIII., sums 6, 9, and 12; *or*

Todhunter, Example XV., sums 1 to 22.

Simple Equations.

Hamblin Smith, Example XXXII., sums 3, 6, 9, 12, etc., up to 30, and Example XXXIII., sums 4, 8, 12, etc., up to 36.

Charles Smith, Example XVI., sums 5, 10, 15, etc., up to 50, and Example XVII., sums 5, 10, 15, etc., up to 55.

Todhunter, Example XIX., sums 10, 20, 30, etc., up to 60; Example XX., sums 10, 20, 30, etc., up to 60, and Example XXI., sums 8, 16, 24, up to 48.

(*g*) Euclid.

(1) *Deighton*, pp. 1 to 9; and (2) pp. 9 to 17, including Exercises; *or*

(1) *Todhunter*, pp. 1 to 6, 252, 253; and (2) pp. 6 to 11, and Exercises 1, 3, 5, 7, on p. 340.

(*h*) Mensuration.—*Todhunter.*

(*i*) Arithmetic.

Males.—*Pendlebury*, pp. 10 to 17, and 20 to 23.

Females.—(1) *Dixon and Beach's Arithmetic*, pp. 14 to 23, and (2) pp. 90, 91, and sums 7, 24, 40, and 42 of Example XV.

(*j*) History.

Sanderson, (1) pp. 266 to 277; (2) pp. 277 to 289; *or*

Ross, (1) pp. 307 to 330; (2) pp. 331 to 343.

(*k*) Geography.

Anderson, pp. 176 to 180, *or Moffatt's New Geography*, pp. 337 to 342.

(*l*) English.

(1) Write a short Essay on '*Some uses of the Electric Telegraph.*'

(2) *Dr. Beach's* '*Elements of English*,' pp. 165 to 170.

(*m*) French.

Dargué's Elementary French Course, pp. 13 to 25, the first seven lessons.

(*n*) School-Management.

Gladman's, pp. 133 to 143.

(*o*) What do you understand by the term '*Gathering*'? For what purpose is it employed? Give rules for gathering and setting into a band, and say what points should be noticed in teaching the stitch to a class of girls.

(*p*) *Savings and Investments.—Hughes's Domestic Economy*, pp. 413 to 423.

With Especial View to the Scholarship Examination:—

I. Miss Sophy Loch (Examiner of Needlework under the London School Board) is furnishing in our columns a series of papers on 'Needlework for Pupil Teachers.'

II. Miss Elsie Scott (first on Scholarship List, 1890) is reproducing her 'Model Answers,' and

III. Mr. L. Huxley, M.A., will deal fully with the Latin.

Books Recommended for History and Geography.

Sanderson's 'History of the British Empire' (Blackie & Son) *or* Ross' Manual (Simpkin & Marshall); Curtis' Date Book (Simpkin & Marshall), 6d.; Anderson's Geography (Nelson), 1s. 9d., *or* Paige's New Geography (Moffatt & Paige), 4s. 6d.

In our last issue, answer to 'F. S.' in the Arithmetic Query Column should be well apprehended.

Selected Government Questions.

(*On portion of work set for week.*)

1. Show that $(7a + 6b + 5c)^2 - (5a + 6b + 7c)^2 = 24\,(a-c)\,(a + b + c)$.

2. Solve the equations—

(*a*) $\frac{3x-8}{25} + \frac{4x-9}{35} = \frac{5x-27}{14}$. Ans. $x = 11$.

(*b*) $\frac{x+10}{5} - \frac{19}{4} - \frac{x}{4} = \frac{x-2}{3} - (x-1)$. Ans. $x = 5$.

3. Define plane superficies, right angle, figure, semicircle, oblong, and demonstrate Euclid I. 5.

4. When the method of Short Division is employed in cases of inexact division by breaking up the divisor into factors, explain how the *remainder* is obtained. Divide 319 by 42, *e.g.*, by $(2 \times 3 \times 7)$ to explain your rule.

5. Simplify $\frac{2}{15}$ of $8\frac{1}{3}$ of $12\frac{3}{4} + \frac{3}{10}$ of $1\frac{1}{11} - \frac{3}{11}$ of $1\frac{1}{10}$.
Ans. $3\frac{33}{110}$.

6. Subtract 1·003755 quarts from ·04325 of a bushel, and give the answer as the decimal of a pint. Ans. ·76049.

7. How many yards of carpet 27 ins. wide will cover a room 24 feet 6 inches long by 6 yards wide, and what will it cost at 4s. 6d. per yard? Ans. £14 14s.

8. Compare the English people of the 17th with those of the 19th century, in regard to—(*a*) their dwellings; (b) their employments; and (*c*) their means of locomotion.

9. Trace the descent of Anne from Henry VIII.

10. Name six famous mountains, one in each of the six great divisions of the world, and describe the scene which would present itself to your eyes had you an uninterrupted view of the surrounding country from the summit of *one* of them.

11. Draw a sketch map of the Mississippi, marking in its sources, five tributaries and six towns.

12. Paraphrase the following:—

'Ah! what avail the largest gifts of Heaven
When drooping health and spirits go amiss?
How tasteless then whatever can be given!
Health is the vital principle of bliss,
And exercise, of health. In proof of this
Behold the wretch who wastes his life away,
Soon swallowed in disease's sad abyss;
While he whom toil has braced or manly play
Has light as air each limb, each thought as clear as day.'

13. How do you account for the presence in English of so many words of Latin origin? Say by what token—either as regards spelling or construction—you can recognise that an English word is derived from the Latin; and give some examples.

14. What is meant by good discipline? What are the means and ways of improving discipline?

15. Say what is meant by a 'Benefit Society'; what sort of rules it enforces, and what are the advantages and the risks connected with them?

16. Write in LARGE HAND '*Victoria Nyanza.*'
,, SMALL HAND '*An honest tale speeds best, being plainly told.*'
,, ROUND HAND '*The Ides of March, remember.*'

17. Dictation.—Whatever I have tried | to do in life | I have tried | with all my heart to do well; | whatever I have devoted myself to, | I have devoted myself to | completely; | in great aims and in small, | I have always been | thoroughly in earnest. | I have never believed it possible | that any natural or improved ability | can claim immunity | from the companionship of the steady, | plain, | hard-working qualities, | or can hope to gain its end without them. |

(To be continued.)

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The Practical Teacher.

WHEN the Executive was discussing the question of the 'extraneous duties' imposed on many teachers as a condition of receiving or keeping their appointments, some very curious 'modern instances' were given. Mr. Yoxall mentioned a case where the schoolmaster had to don his dress suit and stand behind the vicar's chair whenever the reverend gentleman had a dinner party. This brings to mind the story told by Dean Ramsay about a Scotch lady, of a class now extinct, who was making enquiries concerning the character of a cook whom she was thinking of engaging. The servant's late mistress said that she was a very 'decent woman.' 'Oh, dash her decency,' replied the lady. 'can she make good collops?' With the same frank disregard of non-essentials, Mr. Yoxall's clergyman, when reading in the testimonials of some candidate for the post of village schoolmaster references to his skill as a teacher, must have exclaimed, 'Oh, dash his teaching, can he wait at table?'

***

THE Executive has mapped out the country into districts, and placed each district in charge of a particular member whose duty it is to rouse the apathetic, to encourage the zealous, and to awaken in all an intelligent interest in the questions before the Union. To do this involves frequent visits to local associations, and the travelling expenses incurred in such visits are naturally reimbursed. It seems that there are two men who object to this reasonable arrangement. These are a Mr. Gale and a Mr. Brain. Mr. Gale recently wrote 'calling attention to the fact that members [of the Executive] who visit Associations are provided at the expense of the Union with the means of securing personal support not vouchsafed to new candidates for Executive honours,' and Mr. Brain sent a resolution to the same purpose. It is but right that journeys undertaken in the service of the Union should be paid for by the Union; the time, the abilities, and the energies of the Executive are not paid for. They are as gratuitous as the ungracious and ungrateful insinuation of Mr. Gale and Mr. Brain. Whenever we hear petty motives imputed we think of Balzac's dictum that no one can really believe another guilty of an act of which he does not feel himself capable.

***

AT the same meeting of the Executive, a resolution was reported from the North Cardiganshire Association:—'That we as an Association of rural teachers thoroughly disapprove of the way in which the Executive, at their last meeting, postponed the important question of compulsory drawing in rural schools, and that we hereby pledge ourselves that in future we shall not in any way support any member of the Executive who do not, regardless of his personal likes and dislikes, go in for making drawing an optional subject and thereby consider the interests of country schools.' The ignorance which this resolution displays of the rules of English grammar, is equalled only by the ignorance which it displays of the action of the Executive. There is no provision of the Code against which the energies of the Executive have been so persistently directed throughout the year as that which makes drawing compulsory in all schools. The present members may as well make arrangements for retiring. The North Cardiganshire Association (which according to the last published report numbered seventeen) will not vote for them.

***

TALKING of retiring, we are sorry to see that four of the oldest members of the Executive, Messrs. Dawson, Rankilor, Smith, and Wild, have announced their intention of not seeking re-election. That persons who have for many years given up the greater part of their leisure to the service of their fellow-teachers should now seek repose is very natural, but it is none the less to be deplored that they should already claim the *otium cum dignitate* which they have so fully earned. The Executive will do the most effective work when the dash of youth is balanced by the caution of experience.

***

THE Executive has adopted, with slight verbal alterations, the memorial of the Decimal Association in favour of a Royal Commission 'to inquire into a report upon the advisability of the prompt adoption of a decimal system.' There is no denying that our present complicated scheme of money, weights and measures, leads to the absolute waste of a large fraction of the all too brief school life of our children. If we had a decimal system nearly the whole of the arithmetic of Standards III. and IV. would disappear, and the calculations involved in the work of the higher standards would be greatly simplified, so that much of the valuable time now spent on arithmetic would be gained for other studies. The difficulty lies not in proving that our present scheme is bad but in suggesting an acceptable one to take its place. Our people would not be likely to adopt the metric system and we have seen no other practicable system suggested.

***

THERE are two opinions concerning the advisability of abolishing school fees, but there can be only one opinion concerning the motion which the Executive at its last meeting resolved to place on the Conference agenda,—'That . . if a system of free education be introduced . . the freedom from payment of fees should extend to the whole period of school attendance.' The Scotch have already amply proved the fatal folly of abolishing fees only up to the standard of exemption. When children have passed that standard they are taken away from school and thus lose the most valuable part of their education,—the part towards which the preceding years have been but a preparation. Were the abolition, on the other hand, to begin only when compulsion begins, our infant schools would remain half empty and the foundations for future teaching would not be well and truly laid.

***

WITH the New Code was introduced the practice of testing the spelling in Standard IV. by giving for dictation passages from books not in use in the school. On October 4th, the Executive, by a small majority, carried a resolution condemning the innovation. At the last meeting, however, this resolution was, on the motion of Mr. Organ, rescinded without

discussion, and a proposition in favour of extending the practice to the lower Standards was passed. When it is known that the dictation will be given from a particular book the temptation to cram all the hard words in the book is almost irresistible, whereas the only adequate preparation for taking down an 'unseen' passage is the thorough and systematic teaching of spelling. Of course a more lenient Standard must be adopted by the Inspectors under the new plan, and it was a fear that some of them would prove unreasonable which actuated those in favour of the first resolution of the Executive. The fear has now probably been dispelled by the circular of the Education Department on the subject.

A Course of Object-Lessons and Elementary Science.

(Adapted to the Syllabus of the New Code and of the London School Board.)

BY RICHARD BALCHIN.

Head Master under the School Board for London.

THERE is a two-fold purpose to be continually kept in view in object-lesson teaching. First, the imparting of accurate knowledge. Second, the exercise of certain mental faculties. The amount of the knowledge imparted can be estimated, to a large extent, at the yearly examination; but the degree to which the child-mind has been exercised and strengthened throughout the year, is by no means so easily tested. And yet this latter purpose is at least as important as the former. It is, I am afraid, only too often the case that the success of the class-teacher who takes this subject of elementary science, is gauged simply by the number of facts the examiner discovers stored in the memories of the children. I am told the examination usually takes this form:—there are, say, sixty boys in five rows of desks; the dozen forming one row are asked a question; the number of hands held up are counted; and it is considered a poor result if ten out of the twelve cannot give the correct answer. This test is repeated in the case of the other rows, and so the year's work of the teacher is estimated and duly recorded in the little red-leather book which we all know so well. I am, however, bound to say that in my school the Inspectors have never confined themselves to this purely mechanical mode of examination. They have invariably asked the teacher himself to go on from some point in the syllabus; and as we know that this method will be adopted, we always have a few specimens on the table ready. The examiner then closely observes, not merely *how many* answers are given, but also *how* they are given; how a boy's interest is excited in the subject; how his attention is fixed; how the power of rightly observing the objects before him has been exercised; and how far the mind of the teacher is in sympathy with that of the child. Now I maintain that Inspectors, at least all those of whom I have had any experience, are quite able to estimate, not only the amount of knowledge that has been imparted during the year—a very important matter, but also the use, as an educative agent, which has been made of this subject, Elementary Science: perhaps a much more important matter.

Continuing our Notes of Lessons for Standard I. we now come to the ninth.

THINGS IN OUR HOMES:—DRESS.

9. Have on the table specimens of cotton, flax, wool, silk, leather.

Note that we obtain the materials for our dress from plants and from animals. Have a boy out, and refer to his different dress-materials.

(*a*) From plants.—Cotton. Give a brief description of the cotton-plant and the steps in the manufacture of cotton-cloth and calico. Flax. Do the same with linen. Straw.

(*b*) From animals.—Wool. Carry on a conversation about the specimens, and note the processes from the raw wool to the woven cloth or flannel. Silk. Do the same as with wool. Leather and fur may be briefly noted. The boys may be asked whether there is any article of their dress which is derived neither from plants nor animals; ex., brass buttons, boot-nails, &c.

THINGS IN OUR HOMES:—ARTICLES OF GLASS.

10. Have on the table some white sand, soda, pearlash, lime; and red-lead, separate and mixed. The latter called 'Batch.' Also a picture of a glass factory. A few articles of glass. Give a short account of glass manufacture.

The batch is put into earthen pots in a furnace; melts, and forms glass. Thick like treacle. The workman takes out a lump of this glass, sticking on the end of a tube through which he blows, and the glass assumes the form of a bubble. This is 'blown' glass. In this way bottles are made. For sheet or common window-glass, the bubble is whirled round rapidly while still soft, and upon being opened, flies into a circular sheet.

Plate glass.—The melted glass is run out upon level tables, and when cool, the surface is polished. Tumblers, decanters, bottles (for lemonade and soda water), are shaped in moulds. These are sometimes ornamented or 'cut' by grinding against a wheel.

THINGS IN OUR HOMES:—EARTHENWARE.

11. Have on the table, either a model or a picture of a potter's wheel. Some white clay, brown clay, and glaze powder.

Talk about hardware, crockeryware, earthenware. Show a piece of white clay in one hand, and a plate in the other. Say we are now going to find out how the one is formed into the other. The lump of white clay is 'shapeless,' therefore the first thing is to bring it into some shape. Describe the revolving table or potter's wheel. Then the drying or hardening—not baking yet. When thus hardened under a moderate heat, the ware is called 'biscuit;' it has not a 'shiny' surface, yet water will not wash the surface off. Now, if the plate, &c., is to be figured, the painting is done. Then a milky-looking liquid—glaze—is put on and all the painting is covered up; the article is now quite white and the surface rough. It is at once put into an oven, baked to a white heat, when the glaze becomes a coating of transparent glass through which the various colours and figures can easily be seen.

OTHER THINGS IN OUR HOMES.

A variety of objects may be selected according to the teacher's fancy; ex., a pair of bellows; a gas-stove; a broken or burst water-pipe; a lucifer match, &c.

THINGS IN THE STREETS:—STONES.

12. Have on the table fragments of different kinds of stones:—sandstone, granite, limestone, marble. Talk about these stones. Note the difference observable between a piece of granite and a piece of sandstone. Break up pieces of each, and note the difference of the powders. The granite powder consists of grains of different colours: that of the sandstone nearly the same coloured grains throughout. Note the lines along the edge of the sandstone; no such lines in granite. Sandstone splits along these lines, hence easily broken into slabs; used for the pavement. Granite, harder, used for the curb and the road. Why? The ornamental stone work round the street door, and the figure over the door, are limestones. Easily worked because soft. Why called limestone. When burnt, becomes lime. Use of lime. Some limestone so hard it can be polished: then called marble. The softest limestone is chalk. Show picture of a chalk-pit and lime-kilns.

In my next article, I purpose reproducing a lesson upon the 'stones of the streets,' which I have actually given to a class of First Standard boys.

(To be continued.)

—o—

Tests in Mental Arithmetic.

STANDARD I.

1. Take 3 times 6 from a score — 2.
2. How many more than a score is 4 times 7? — 8.
3. How many times can you take 4 from two score? — 10.
4. How many times can you take 6? — 6.
5. How many would be left? — 4.
6. A man spent 5 threepenny pieces in penny oranges; how many did he buy? — 15.
7. How many halfpenny ones could he buy with the same money? — 30.
8. How much would 6 lemons cost at 1½d. each? — 9d.
9. How many could I get for a shilling? — 8.
10. What would 5 lbs. of soap cost at 4d. per lb.? — 1s. 8d.
11. What change would you get out of a florin? — 4d.
12. How much would 2½ lbs. cost? — 10d.

STANDARD II.

1. How many boys are there in 5 desks, if there are 7 in each of three desks, and 8 in each of the others? — 37.
2. If there were three score in the desks, how many would there be in each desk? — 12.
3. If you gave each of the 37 boys a penny, how much would you want? — 3s. 1d.
4. How much would you have left out of 2 florins? — 11d.
5. What is the half of 11d.? — 5½d.
6. What is the half of 5½d.? — 2¾d.
7. How many tenpenny books can I buy for 6s. 8d.? — 8.
8. How many fivepenny ones can I buy? — 16.
9. How many days are there in 5 weeks? — 35.
10. If a boy saves 2d. a day, how much will he have in that time? — 5s. 10d.
11. How much more would he want to have half-a-sovereign? — 4s. 2d.?
12. How many more days must he save to have it? — 25.

STANDARD III.

1. How much is required to give 35 boys a half-penny each? — 1s. 5½d.
2. How much would you have left out of half-a-crown? — 1s. 0½d.
3. How many half-crowns could you get for £9? — 72.
4. How many florins could you get? — 90.
5. How many sixpences could you get? — 360.
6. How many stone are there in 7½ cwt.? — 60.
7. What would 7½ cwt. cost at 5d. per stone? — £1 5s.
8. What would be the cost at 2½d. per stone? — 12s. 6d.
9. How many minutes are there in 9 hours? — 540.
10. If a man can do 3 sums in 10 minutes, how many can he do in an hour? — 18.
11. How many could he do in an hour and a half? — 27.
12. How many yards are there in 5 chains? — 110.

STANDARD IV.

1. A ladder is 9 yards long; how many inches is that? — 324.
2. How many of those ladders would it take to reach a mile? — 196.
3. How far beyond a mile would they reach? — 4 yards.
4. How many weeks and days will there be in January and February 1891? — 8 weeks 3 days.
5. What part of a day is 3 hours? — ⅛.
6. What part of an hour is 4 minutes? — $\frac{1}{15}$.
7. What is the difference between $\frac{1}{30}$ and $\frac{1}{40}$ of a sovereign? — 2d.
8. $\frac{1}{8}$ ton + $\frac{1}{4}$ ton + $\frac{1}{10}$ ton. — 11 cwt.
9. What would 11 cwt. cost at 9d. per quarter? — £1 13s.
10. How many pint bottles of wine can be bought for £6 at 5s. per quart? — 48.
11. If six hats cost a sovereign, what will five cost? — 16s. 8d.
12. How many could you get for £2 10s.? — 15.

Standard V.

1. What will 700 books cost at 3s. 4d. each? £116 13s. 4d.
2. What will they cost at 10d. each? £29 3s. 4d.
3. Take $\frac{2}{5}$ of 40 from $\frac{4}{7}$ of 42. 11.
4. What fraction of 40 is 24? $\frac{3}{5}$.
5. What fraction with Denominator 15 is equal to $\frac{2}{3}$? $\frac{10}{15}$.
6. If a boy had $\frac{3}{4}$ of a cake, and he gave half away, how much had he left? $\frac{3}{10}$.
7. What decimal is equal to $\frac{3}{5}$? ·6.
8. What is a twelfth of that? ·05.
9. What vulgar fraction is equal to that decimal? $\frac{1}{20}$.
10. Find the difference between $\frac{1}{4}$ and $\frac{1}{10}$ $\frac{1}{5}$.
11. What is the interest on £350 for three years at 4 per cent.? £42.
12. What would be the amount in 6 years? £434.

Standards VI. and VII.

1. Find the L. C. M. of 4, 6, 8, 12, and 16. 48.
2. What must you add to $2\frac{2}{3}$ to make $31\frac{7}{12}$? $28\frac{3}{4}$.
3. What decimal of a guinea is 6s.? ·285714.
4. Multiply ·07 by ·008. ·00056.
5. Divide ·07 by ·008. 8·75.
6. What sum will gain £60 in 5 years at 3 per cent.? £400.
7. In what time would it gain £75? $6\frac{1}{4}$ years.
8. If 12 yards of cloth, which cost £3 10s., were sold at a gain of 10 per cent., what was the selling price per yard? 6s. 5d.
9. What percentage is a dozen of a score? 60 per cent.
10. What percentage is a score of a dozen? $166\frac{2}{3}$ per cent.
11. How much stock in the 4 per cents. at 110 could be bought for £979? £890.
12. What must be the price of the 3 per cents. to get 4 per cent. interest? 75.

—o—

My Scholarship Answers.

BY MISS ELSIE SCOTT.

(*First on the List—Females.*)

School Method.—(*continued.*)

4. It is said that 'in teaching we should proceed from the known to the unknown.' Explain what this means, and show how it is applicable to a lesson on either geography or grammar.

This phrase means that we should always explain and illustrate every new fact we have to teach by comparing it with some every-day thing the children have seen, or with something they have learned before and already understand. Thus in geography the terms mountain, river, lake, etc., can be explained by reference to some neighbouring hill, or pond, the water running down the gutter, etc. The draught from a door or window will help in explaining the origin of winds, and so on.

Again, in grammar elementary knowledge can be used in teaching the more advanced part. Subordinate clauses can be compared to the corresponding parts of speech, and their use shown by examples such as the following:—

The *tired* child lingered behind. (Adj.)

The child, *who was tired*, lingered behind. (Adj. Sen.)

5. Give a list of the maps, pictures, diagrams, and apparatus, which you think ought to be provided in a well-furnished school-room.

(1) *Maps.*—Maps of the World, the five continents, the British Isles, the colonies, London, or the county in which the children live.

(2) *Pictures* illustrating the different geographical terms, and scenes in different countries.

(3) *Diagrams* illustrating Day and Night, the Seasons, the Phases of the Moon, etc.

(4) *Apparatus.*—A globe, and a set of balls, half black and half white.

6. What are the advantages and disadvantages of simultaneous reading, and when and how should the practice be adopted?

(1). *Advantages.*—(*a*) It encourages distinct and careful articulation. (*b*) It secures uniformity in tone, speed, and expression. (*c*) It helps those who are backward. (*d*) The pupils get more practice than by any other method.

(2). *Disadvantages.*—(1) Individual faults are not detected. (2) Any fault, if not corrected at once, will spread through the class. (3) Without great care, the tone and inflection tend to become sing-song.

It is clear, therefore, that simultaneous reading needs great care and watchfulness on the part of the teacher. The teacher should set a pattern himself first, and require the class to imitate him. Simultaneous reading is best suited for the lower standards, where much practice in the mechanical part of reading is necessary.

10. Show by what sort of visible objects and illustrations you could make the rule for addition of fractions intelligible to a class of beginners.

The rule for addition of fractions can be illustrated in the following manner:—

(*a*) Show, by means of folding slips of paper, that when we multiply the numerator and denominator of a fraction we do not alter the value, *i.e.*, $\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16}$, and $\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$, etc.

Then take an easy example. $\frac{1}{2} + \frac{1}{4}$. Show by folding in half, and then in four parts, that as $\frac{1}{2} = \frac{2}{4}$, $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$. Show the class how to set this down.

Next work $\frac{1}{2} + \frac{1}{3}$. Show, by folding two equal slips of paper as before, that the paper has to be folded in sixths. Then $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$. Point out that 6 is the L.C.M. of three and two, and compare the working with the rule.

Work similar examples, showing in each case how the rule applies.

13. Give some examples of mental arithmetic suitable for the highest class in a school, and show by what means rapidity and accuracy can be best secured in conducting such exercises.

(*a*) *Examples of mental arithmetic.*—(1) Find Simple Interest on £750 for 3 years at 2½ per cent. (2) Add $\frac{1}{8}$ of £1, $\frac{1}{5}$ of 1 guinea and $\frac{1}{10}$ of 1 crown. (3) Take ·75 of 13s. 4d. from ·625 of £1. (4) I spend $\frac{1}{3}$ of my money in one shop $\frac{1}{4}$, the remainder in another, and have 6s. 8d. left; what had I at first? (5) A man buys an article for 9s. and sells it for 12s., what is his gain per cent.? (6) I can arrange my class in groups of 12, 15, or 20, and have none over. What is the least number I can have in the class?

(*b*) *Means of securing rapidity and accuracy.*—(1) Show the children the quickest methods of working. (2) Arrange them in a class round the room and let them take places, or (3) Give a certain time for each sum, let it be worked mentally, and the answer written down on the slates. At the close let the slates be shown and marked, and marks or places given for the highest number correct.

8. Give dates or approximate dates, and names for the following:—

(*a*) 1279 Statute of Mortmain. (*b*) 1640—1660 The Long Parliament. (*c*) 1539 Parliament in Henry VIII.'s reign. (*d*) 1536 Union of England and Wales. (*e*) 1707 Act of Union. (*f*) 1588 Defeat of the Armada. (*g*) 1679 Habeas Corpus Act. (*h*) 1687 Declaration of Indulgence. (*i*) 1720 The South Sea Company. (*k*) 1713 Treaty of Utrecht. (*l*) 1763 Treaty of Paris. (*m*) 1829 Catholic Emancipation Act.

10. Describe the relations between Rome and the British Isles in the time of two of the following—Agricola, William the Conqueror, John, Henry VIII.

(*a*) *William the Conqueror.* When William invaded England in 1066, he came with the sanction of the Pope. After his accession, he replaced the English prelates by Normans, and by these means the Church of England was brought into closer union with Rome. But when, in 1076, Pope Gregory claimed homage from William, he refused to give it, and ordered that no letters should be received from the Pope without the king's consent.

(*b*) *John.* After the death of Hubert Walter, Archbishop of Canterbury, in 1205 the monks of Canterbury chose Reginald, their prior, as his successor. John chose John de Grey, Bishop of Norwich. Pope Innocent III. set aside both elections and appointed Stephen Langton. John refused to receive Langton, and the Pope laid England under an Interdict. John then attacked the Church property, and in return the Pope excommunicated him. John retaliated by seizing the property of the bishops, and then the Pope deposed him and called on Philip of France to invade England. John, wishing to divide his enemies, submitted and consented to hold England as a fief of the Papacy. The Pope then supported John, threatened to excommunicate the barons who were making war on him, and suspended Langton. The dispute was ended, however, by the death of John, 1216.

11. Give a short biography of Edward 1st or William 3rd. Show the great objects which he sought to attain, and estimate his success.

Edward I., the eldest son of Henry III., was taken prisoner with his father at the battle of Lewes, 1264. He soon escaped, and gathering an army, defeated De Montfort at Evesham, 1265. He reinstated his father on the throne, and then joined the 8th Crusade. Henry died in 1272 and Edward returned to England. He had two great objects in view. (*a*) To establish a thoroughly efficient government. (*b*) To unite the British Isles under one sceptre.

To gain the first he passed a series of good laws, of which the most important are the Statutes of Mortmain, 1279, Winchester, 1285 and Entails, 1285. He also regulated the law courts and enforced justice. To gain his second object, Edward invaded Wales, 1277, defeated Llewellyn, and annexed Wales to England, 1284. He then tried to unite Scotland to England by arranging a marriage between his son Edward and the Maid of Norway, heiress to the Scotch throne. She died, however, and thirteen claimants appeared, of whom the chief were John Baliol and Robert Bruce. Edward was asked to decide, and having first secured the acknowledgment of his superiority, selected Baliol. A dispute soon arose and Edward defeated Baliol at Dunbar, 1296, and made Warenne regent. In 1297 the Scots revolted under Wallace, who was defeated by Edward at Falkirk. The next claimant was Robert Bruce, and as Edward marched against him, he died at Burgh-on Sands, 1307. Thus his second aim was only partially gained.

12. Who was the wife of Henry II., Edward II., Henry VI.? Which of these kings acquired or lost territory by marriage? What active part in historical events did their wives take?

(*a*) *Henry II.* married Eleanor of Acquitaine and thus acquired Guienne, Poitou and Acquitaine. She sided with her sons against their father. She supported Richard and obtained his release. On Richard's death she supported John, and while she lived John held his French possessions.

(*b*) *Edward II.* married Isabella of France. She went to Guienne to settle a dispute, and, while there, conspired with Mortimer to overthrow the De Spencers. They landed, Edward was deposed and murdered. Isabella was shortly afterwards deprived of all power by her son Edward III.

(*c*) *Henry VI.* married Margaret of Anjou, and ceded Anjou and Maine to her father. Margaret sided with Suffolk, and afterwards Somerset, against the Duke of York. When York claimed the crown, Margaret took up arms for her son and gained the battles of Wakefield and St. Albans. She was defeated at Tewkesbury, 1471, and kept a prisoner until ransomed by Louis XI. in 1475.

13. Mention, with dates, risings in the time of the Tudors which were due to discontent caused by religious changes, taxation, or poverty. Give a short account of one of these risings. Mention (*a*) causes which in that period produced distress and vagrancy; (*b*) any measures taken to meet these evils.

(*a*) *Risings in the Tudor Period.*

(1) *1536 Pilgrimage of Grace.* The northern counties under, a lawyer named Aske, rose in rebellion against the suppression of the monasteries. The rebellion was put down and the leaders executed.

(2) *1549, Ket's Rebellion*, caused by poverty brought on by the enclosure of the commons by the land owners.

(*b*) *The causes which produced distress in this period* were :—

(1) The dissolution of the monasteries, in which the poor had formerly obtained relief.

(2) The landlords turned their arable land into pasture, thus throwing many labourers out of work.

(3) The enclosure of the commons which deprived the poor of pasture for their cattle.

(*c*) In order to remedy the distress the first poor law was passed in 1601.

Geography.

2. What difference can you observe :—

(*a*) Between the position of the sun when it is rising in December, and its position when rising in June?

(*b*) Between its position at noon in December and its position at noon in June?

(*c*) In the ebb and flow of the tide at new moon, half moon, and full moon?

(*a*) Owing to the position of the earth in December, the sun will rise towards the south-east. In June, when the northern hemisphere is turned towards the sun, it will rise more directly in the east.

(*b*) At noon in December the sun appears low in the sky. At noon in June the sun is nearer the zenith.

(*c*) The tide rises highest and ebbs lowest at new and full moon, while the difference between high and low tide is least at the half moon. This is owing to the fact that at new and full moon the sun, moon and earth are in the same straight line. Thus the attraction exerted by them upon the earth's surface is greatest at that time. At the half moon the sun and moon partially neutralise each other's attraction. But as the attraction of the moon is greater than that of the sun, the tide produced by the moon is higher than that of the sun.

3. Give some account of the advantages of the position of London for—(*a*) the capital of England; a centre of international trade. By what railway routes could you travel (*a*) from London to Plymouth; (*b*) from London to Manchester? State briefly in what districts the nature of the country caused especial difficulty in the construction of the railways.

The advantages of the position of London are :—

(*a*) *As the capital of England:*

(1) It is near the centre of the south of England and easy of access to all parts of the kingdom.

(2) It is near the Continent.

(*b*) *As a centre of international trade:*

(1) It is the capital of England, which occupies a central position among the trading countries of the world.

(*c*) One can travel from London to Plymouth by the London and South-Western, and Great Western lines; and from London to Manchester by the London and North Western, Midland, and Great Northern lines.

(*d*) Difficulties in the construction of railways have been experienced in the mountainous parts of the northern counties and Wales, and in the Fens.

4. (*a*) In what parts of the world beyond Europe are these languages spoken—English, French, Spanish, Dutch?

(*b*) In what places beyond Africa does the population contain many negroes or persons of negro descent?

(*c*) In what countries are there Mahometans?

(*d*) In what countries are there Chinese immigrants?

(*a*) English is spoken in India, Cape Colony, Australia, New Zealand, and North America.
French is spoken in some parts of Canada and Algeria.
Spanish is spoken in South America.
Dutch is spoken in the Transvaal and Orange Free State.

(*b*) Negroes are found in the United States.

(*c*) Mahometans are found in Turkey, Northern Africa, and Western Asia.

(*d*) Chinese immigrants are found in the west of North America.

6. Where are the following towns? Show in the case of six of them how their importance is due to their position, or give other reasons for the interest attached to them.

Town.	Position.	Importance.
Dundee	On the Tay, Scotland	Of great commercial importance; manufactures linen and sailcloth.
Belfast	On the Lagan, Ireland	Large manufactures and trade in linen, cotton, etc.
Armagh	In county Armagh, Ireland	
Geneva	On Lake Geneva, Switzerland	Manufactures watches and jewellery. Near the French frontier.
Venice	On the Adriatic, Italy	A port, formerly of great importance.
Buda Pest	On the Danube, Hungary	
Warsaw	In Poland	
Corinth	On the Gulf of Corinth, Greece	
Bombay	On Bombay Island, India	A great commercial city.
Hong Kong	An Island at the mouth of the Canton River, China.	A centre of trade and depôt for English produce.

(To be continued.)

Query Column.

Algebra.

1. W. T. Balmer.—Prove that :—The $(r+1)$th term of the expansion $(1+x)^{\frac{1}{2}}$

$$= \frac{1.\ 3.\ 5\ldots(2r-1)}{1.\ 2.\ 3\ldots r}(2x)^r.$$

The $(r+1)$th term of the expansion $(1+x)^{\frac{1}{2}}$ is the middle term, and this term

$$= \frac{\lfloor 2r}{\lfloor r \lfloor r} x^r;$$

$$\text{Now } \lfloor 2r = 1.\ 3.\ 5\ldots(2r-1)\ 2.\ 4.\ 6\ldots 2r$$
$$= 1.\ 3.\ 5\ldots(2r-1)\ 2^r \lfloor r,$$

$$\therefore (r+1)\text{th term} = \frac{1.\ 3.\ 5\ldots(2r-1)\ 2^r \lfloor r}{\lfloor r \lfloor r} x^r$$
$$= \frac{1.\ 3.\ 5\ldots(2r-1)\ 2^r}{\lfloor r} x^r$$
$$= \frac{1.\ 3.\ 5\ldots(2r-1)}{1.\ 2.\ 3\ldots r}(2x)^r$$

2. Student.—At an election A polled 87½ per cent. of the votes promised him, and B 82½ per cent. of those promised him. A was returned by a majority of 28 votes; but if all those who promised had voted, B would have been returned by 160 votes; find the number of votes each received.

Let x = number of A's promises,
and let y = " B's " ;

$$\text{Then (1) } \frac{87\frac{1}{2}}{100}x - \frac{82\frac{1}{2}}{100}y = 28$$
$$\text{(2) } y - x = 160$$

$$\text{(1) } \tfrac{7}{8}x - \tfrac{33}{40}y = 28$$
$$35x - 33y = 1120$$
$$\text{(2) } -35x + 35y = 5600$$

Adding] $2y = 6720$
$\therefore y = 3360$

$\therefore$ Number of votes B received = $\frac{33}{40}$ of 3,360
$= 33 \times 84$
$= 2{,}772.$

" " A " $= 2{,}772 + 28.$
$= 2{,}800.$

3. Xmas.—If $\frac{a}{b} = \frac{c}{d}$, show that

$$\frac{a+b}{a-b} = \frac{c+d}{c-d}$$

$$\frac{a}{b} = \frac{c}{d}$$

$$\frac{a}{b} + 1 = \frac{c}{d} + 1$$

$$\frac{a+b}{b} = \frac{c+d}{d};$$

$$\frac{a}{b} = \frac{c}{d}$$

$$\frac{a}{b} - 1 = \frac{c}{d} - 1$$

$$\frac{a-b}{b} = \frac{c-d}{d};$$

$$\therefore \frac{a+b}{b} \div \frac{a-b}{b} = \frac{c+d}{d} \div \frac{c-d}{d}$$

$$\frac{a+b}{b} \times \frac{b}{a-b} = \frac{c+d}{d} \times \frac{d}{c-d}$$

$$\therefore \frac{a+b}{a-b} = \frac{c+d}{c-d}$$

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1. Add £41,939 17s. 6¼d., £93,998 17s. 6½d., £37,469 17s. 11¼d., £27,096 19s. 8½d., £94,768 17s. 6¼d., £47,369 18s. 7¼d.

2. From £19,101 0s. 3¼d. take £8763 19s. 11¼d.

3. Divide 47,201,009 by 543.

4. What is the number that multiplied by 168 will give 7,493,808 for the answer?

No. 15.

1. Add £14,009 18s. 0¼d., £27,027 0s. 11¼d., £8080 14s. 9d., £70,017 12s. 3½d., £1809 17s. 4½d., £29,220 13s. 6¾d.

2. From £101,100 10s. 10½d. take £93,209 19s. 11¼d.

3. Divide 9,847,632 by 126.

4. A book contains 106 pages, and on each page there are 2986 letters. How many letters are there in the whole book?

No. 16.

1. £94,673 18s. 6½d., £7894 15s. 8¼d., £86 19s. 4¼d., £36,948 17s. 11¼d., £8673 14s. 5½d., £86,359 17s. 10½d.

2. Take 199 18s. 7½d. from £18,601 11s. 4¼d.

3. Divide 296,873 by 97.

4. A man makes 748 bricks in one day. How many bricks would he make in 52 weeks of 6 days each?

No. 17.

1. Add £8694 18s. 7¼d., £93,527 17s. 6¼d., £86 19s. 11½d., £7064 15s. 3¼d., £65,378 14s. 5d., £6493 17s. 7½d.

2. From £61,010 1s. 1¼d. take £7094 18s. 6¼d.

3. Divide 6,020,498 by 86.

4. How many parcels of twelve stamps each could be made from 92,376 stamps?

No. 18.

1. Add £6294 18s. 6¼d., £29,368 17s. 11½d., £86,754 19s. 7¾d., £7938 14s. 6¾d., £83,294 18s. 11½d., £6438 15s. 7½d.

2. From £91,026 13s. 6½d. take £6398 18s. 11¼d.

3. Divide 294,678 by 96.

4. In a road there are 29,546 stones. How many stones would there be in two roads, each twice as large as the one given?

No. 19.

1. £6294 18s. 6¼d., £9358 19s. 4½d., £83,294 18s. 11½d., £7938 14s. 6¾d., £86,754 19s. 7¾d., £29,368 17s. 11½d.

2. Take £7859 18s. 6½d. from £91,026 13s. 6½d.

3. Divide 294,678 by 87.

4. A butcher sells 590 pounds of meat every day. How many pounds of meat will he sell in 52 weeks of six days each?

No. 20.

1. £84,379 18s. 6¼d., £98 13s. 8½d., £56,874 19s. 11½d., £98,745 15s. 7¼d., £438 18s. 11¼d., £94 14s. 5½d.

2. From £47,010 13s. 8½d. take £194 19s. 11¼d.

3. Divide 8,042,609 by 96.

4. A baker sold 421 loaves on Monday, twice as many on Tuesday, and 750 on each of the other four days in the week. How many loaves did he sell in six weeks?

ANSWERS.

No. 1.

1. £41,370 19s. 1¼d.
2. 28,914 7s. 4¾d.
3. 38,756 + 29.
4. 6,364 houses.

No. 2.

1. £130,356 18s. 7d.
2. £6398 17s. 0½d.
3. 313,203 + 29.
4. £85 6s. 10d.

No. 3.

1. £132,760 13s. 6¼d.
2. £45,169 17s. 7¾d.
3. 58,694.
4. 29,347.

No. 4.

1. £201,682 19s. 6½d.
2. £9910 10s. 10¾d.
3. 7479 + 65.
4. 782,592.

No. 5.

1. £60,880 3s. 8¼d.
2. £39,091 11s. 3¾d.
3. 4752 + 42.
4. 5330.

No. 6.

1. £86,575 0s. 0¾d.
2. £60,816 17s. 10¾d.
3. 72,109 + 20.
4. 346,750 loaves.

No. 7.

1. £132,760 13s. 6¼d.
2. £45,169 17s. 7¾d.
3. 590 + 8.
4. 1,549,296.

No. 8.

1. £97,105 9s. 0¾d.
2. £9,948 15s. 0¾d.
3. 6,139 + 138.
4. 6144.

No. 9.

1. £19,216 10s. 4d.
2. £14,960 11s. 0¾d.
3. 1,737 + 93.
4. 30,240.

No. 10.

1. £130,186 2s. 5d.
2. £40,047 14s. 1¾d.
3. 7350 + 6.
4. 226,080.

No. 11.

1. £178,601 2s. 10¾d.
2. £20,910 15s. 1¾d.
3. 5476 + 69.
4. 176.

No. 12.

1. £156,595 2s. 2¾d.
2. £22,701 14s. 10¾d.
3. 69,428 + 60.
4. 450 miles.

No. 13.

1. £169,026 0s. 6d.
2. £22,832 17s. 7¾d.
3. 63,582 + 6.
4. 120,000.

No. 14.

1. £342,654 10s. 11d.
2. £10,337 0s. 3½d.
3. 86,926 + 191.
4. 44,606.

No. 15.

1. £150,165 16s. 11¾d.
2. £7890 10s. 10¾d.
3. 78,155 + 102.
4. 316,516 letters.

No. 16.

1. £234,638 3s. 11¾d.
2. £18,401 12s. 8¾d.
3. 3060 + 53.
4. 233,376.

No. 17.

1. £181,247 3s. 5¾d.
2. £53,915 2s. 6½d.
3. 70,005 + 68.
4. 7698 parcels.

No. 18.

1. £220,091 5s. 3¾d.
2. £84,627 14s. 6¾d.
3. 3069 + 54.
4. 118,184 stones.

No. 19.

1. £223,011 9s. 0¾d.
2. £83,166 15s. 0d.
3. 3387 + 9.
4. 184,080 pounds.

No. 20.

1. £240,635 1s. 2¾d.
2. £46,815 13s. 8¾d.
3. 83,777 + 17.
4. 153,468 loaves.

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